

GeneralGENERAL

The structure of a PROGRAM LIBRARY TAPE is as follows:-

This section specifies various standards and conventions to which programs and subroutines in the Service Routine Library should conform. Further conventions are included which are designed to facilitate utilization of these routines and to promote optimum methods.

Index block	}	Program 1	("Program" in this context includes binary programs and usercode programs, subroutines or any other piece of program text stored on magnetic tape)
Information blocks			
Last block			
Index block	}	Program 2	
Information blocks			
Last block			
.			
.			
.			
.			
Index block	}	Last program	
Information blocks			
Last block			
Terminating last block			

All index blocks and information blocks contain 256 words, label blocks contain 2 or 3 words, and "last blocks" and the terminating "last block" contain one word.

The index block of a program contains information (e.g. its title) about the program, while the information blocks are the body of the program itself. The "last block" is a marker to indicate the end of the program. The terminating "last block" is a marker to indicate the end of the useful information on the tape.

Information blocks are of two types, "text" blocks when they contain usercode programs, routines, etc. and "binary program" blocks when they contain machine code program.

Block Count and Sum Check

Every index block and information block contains in its last two words a "block count", which is, in general, the number of the block within the program, and a "sum check" which is the sum of all the words in the block. The 96 bits of these two words are constituted as follows:-

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Section 22.1 (cont.)

22.1

word 255 DO-15 = block count

word 255 D16-47) = 80 bit sum of words 1-254 plus the
word 256 DO -47) block count.

The 80-bit sum is formed by fetching word 255, shifting it down 32 places and extending it to double length (by using the instruction STR;). Each of the words 1-254 is then fetched in turn, extended to double length, and added into the sum. The most significant 16 bits of this sum (either all 0's or all 1's) are then removed, leaving the 80-bit sum.

Index Blocks

This is a 256-word block constituted as follows:-

Word 1)	16 characters consisting of (07) ₈ (02) ₈
)	T,K,W,M or R(02) ₈ and the 12 character
Word 2)	"identifier".
Word 3)	The descriptive title. The last character
to)	of word 8 must be an EM.
Word 8)	
Word 9)	All zero
to)	
Word 254)	
Word 255)	Block count (=0) and sum check.
Word 256)	

The third character of word 1 is as follows:-

T	if the information blocks contain program Text i.e. Usercode program.
M	if the information blocks contain binary program.
R	if the information blocks contain a library Routine e.g. a library subroutine.
K	if the information blocks contain a KALGOL or FORTRAN segmented program.
W	if the information blocks contain a WALGOL program.

Words 1-8 must consist only of characters from the Identifier Set (see Section 22.5.4).

Information Blocks (Text)

Text blocks contain 256 words each, constituted as follows:-

Word 1)	Text in "lines" (including dummy lines) in
to)	Algol Basic Symbols.
Word 254)	

Section 22.1 (cont.)

22.1

Word 255 } Block count (= number of blocks of information in
Word 256 } program) and sum check.

A "line" of text occupies n whole consecutive words ($1 \leq n \leq 30$) in one block, each word containing six 8-bit Algol Basic Symbols (see Section 22.6)

The first word of the line contains "n" in bits D3-7 and markers in bits D0-2 as follows:-

D0 = 1 if the line contains no printing characters,
D0 = 0 otherwise.

D1 = 1 if the line is a dummy line,
D1 = 0 otherwise

D2 = 1 if the line is formed by a library call
D2 = 0 otherwise

The remainder of the first word and the other $(n-1)$ words contain the characters of the line. Unused character positions contain $(377)_8$.

A "dummy" line is used to fill out space as required and may occur anywhere in a block. It contains $(n)_8$ words and has the format

$\left\{ \begin{array}{l} (100+n)_8 \\ (300+n)_8 \end{array} \right\} (377)_8 (377)_8 (377)_8 \dots (377)_8 \left\{ \begin{array}{l} (240)_8 \\ (377)_8 \end{array} \right\}$

The end message terminating any text forms a line of its own, called the "last line of text", with the format

$(001)_8 (377)_8 (377)_8 (377)_8 (276)_8 (240)_8$

The remainder of the block, containing the last line of text, contains no lines other than dummy lines, and the next block is the last block.

Information Blocks (Binary)

Information blocks for binary programs contain 256 words each. The first of these blocks (block 1) is the program's B-block with the following format:-

Word 1 } B-block, as on paper tape. The lower half of word 1
to } of the B block is 0 when the last C block contains
Word 8 } a grand sum. Words 3 and 4 contain a copy of words
1 and 2 of the index block. Word 8 is the first
"filler" word (see Programming Manual).

Word 9 }
to } All zero.
Word 254 }

Word 255 } Block count (=1) and sum check of the magnetic tape
Word 256 } block.

Blocks 2 onwards, up to and including the last but one block, are program C-blocks and have the following format:-

Section 22.1 (cont.)

22.1
Standard label

Word 1) Binary program
to
Word 253)

Word 254 Filler word

Word 255) Block count (= number of information block in
Word 256) program) and sum check.

The last of the program C-blocks has the following format:-

Word 1) Binary program
to
Word n)

Word (n+1) Grand sum of the binary program

Words (n+2)) All zero
to

Word 254)

Word 255) Block count (= number of information block in
Word 256) program) and sum check.

The "grand sum" is the sum of all the words 1-253 of all the C-blocks (words 1 to n of last C-block) accumulated single length, ignoring overflow.

Last Blocks

The last block, indicating the end of a program, is a single word "last block". It contains (n+3) in D0-15, where n is the number of the preceding information block, except for the "last block" immediately following the label block, when D0-15 = 0. D16-47 are ignored.

The terminating Block

The terminating block, indicating the end of the useful information on the tape, is a single word "last block". It has zero in D0-15; D16-47 are ignored.